



Comparison of fundamental natural period of masonry and reinforced concrete buildings retrieved from experimental campaigns performed in Italy, Greece and Spain

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Aim of this study is the experimental estimation of the dynamic characteristics of existing buildings and the comparison of the related fundamental natural period of the buildings (masonry and reinforced concrete) located in Basilicata (Italy), in Madrid (Spain) and in Crete (Greece). Several experimental campaigns, on different kind of structures all over the world, have been performed in the last years with the aim of proposing simplified relationships to evaluate the fundamental period of buildings. Most of formulas retrieved from experimental analyses provide vibration periods smaller than those suggested by the Italian Seismic Code (NTC2008) and the European Seismic Code (EC8). It is known that the fundamental period of a structure play a key role in the correct estimation of the spectral acceleration for seismic static analyses and to detect possible resonance phenomena with the foundation soil.

Usually, simplified approaches dictate the use of safety factors greater than those related to in depth dynamic linear and nonlinear analyses with the aim to cover any unexpected uncertainties. The fundamental period calculated with the simplified formula given by both NTC 2008 and EC8 is higher than the fundamental period measured on the investigated structures in Italy, Spain and Greece. The consequence is that the spectral acceleration adopted in the seismic static analysis may be significantly different than real spectral acceleration. This approach could produces a decreasing in safety factors obtained using linear seismic static analyses.

Based on numerical and experimental results, in order to confirm the results proposed in this work, authors suggest to increase the number of numerical and experimental tests considering also the effects of non-structural components and soil during small, medium and strong motion earthquakes.

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